Menlo Park Notebook #20 [N-79-02-24.1]

This notebook covers the period February-June 1879. The entries are by Edison, Charles Batchelor, and Francis Upton. All of the material relates to experiments on electric lighting and on the telephone. The electric light material includes notes and drawings of lamps, coating filaments, and generators, among which is a caveat drawing by Edison. There are also notes and calculations about electric power distribution systems and notes on experiments to be performed. The telephone material relates to a series of experiments by Edison and Batchelor, many of which were on chalks. The label on the back cover is marked "Caveat," "Thompson," and "Jose Husbands." The book contains 284 numbered pages.

Blank pages not filmed: 54-55, 266-269.

Missing page numbers: 271-272.

No 20.

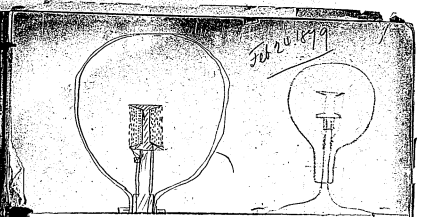
1/2 inch 9/100 .00

20
.060 1/32
.030

1/32 .024
2
.1048
.1024

6 inches .010
.030
6
6 inches .010 is 2/ .180
.08 .09

.18
64 X 8 12) .18 (01 5
12
60
19.2 48
3.8
1.9



Feb 2 1879

Edison Laboratory Note Book. No. 20.

Pages 1 to 15.

Incandescent Electric Light.

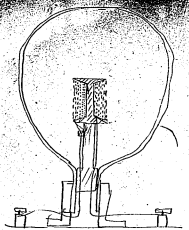
See Edison Patents:
214,636
214,637

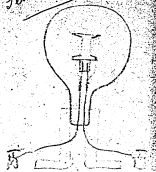
No 20.

1/2 inch 3/100 .00

20
.060 1/32
.038

Feb 2 1879





Iron Platinum

Nickel Platinum.

Iron – Platinum foil.

Carbon in coiled state coated with lime and sealed in platinum – or Pt-Ir. – or Iridium cylinder

[illegible] OF TARIFF CONTROL

120 BROADWAY, NEW YORK.

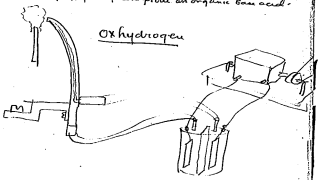
GENERAL ELECTRIC.

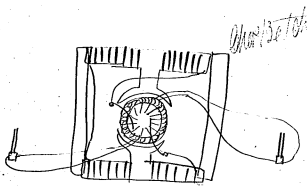
[illegible], 189[illegible].

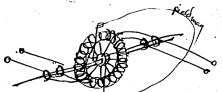
Feby 24. 1849 —

puffy magnesia from an organic bone acid.

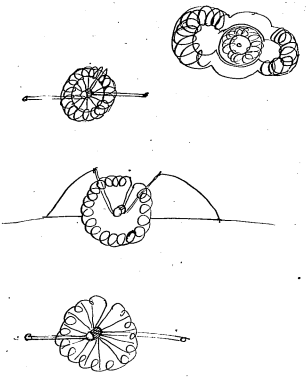
Ox hydrogen







Feby 24. 1879

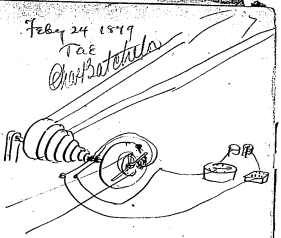


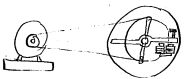
Chas Satchell

Feby 24 1879

TAE

Chas Batchelder

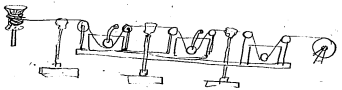




Dynamometer

Feby 24 1879

Chas Batchelor

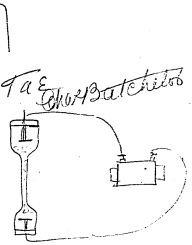


Coat wire by a saturated solution of a salt of Zircon Cerium - Magnesia, Titanium, Lime, Alumina, or other infusible oxide -

Several coatings can be put on -

Instead of heating by the direct flame a thin tube may be heated & the wire pass through that or through a Coil of platinum wire kept

Incandescent by a Battery -



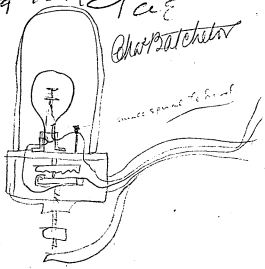
Feby 29. 1879 Tae Edison Battery

full puffy ebria
Lime or magnesia
Jump Spark -

H

Feby 29 1879 T.A.E

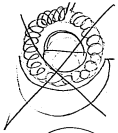
Chronotachister

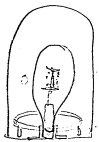


Lamp connected to Coil for quantity Lamps

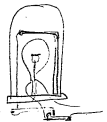
Feby 29, 1879

Ta E
Edw Patentee





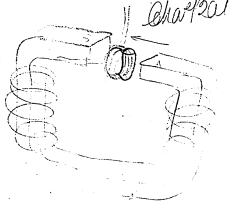
Platinized
Zinc rod

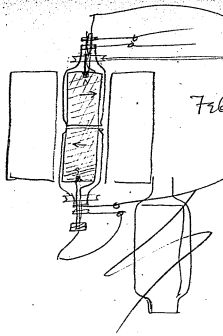


16

15

Feby 28 1879





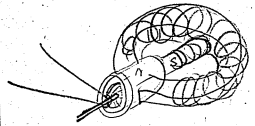
Feby 28 1879

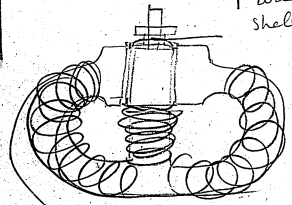
Gas

Chas. Batchelor

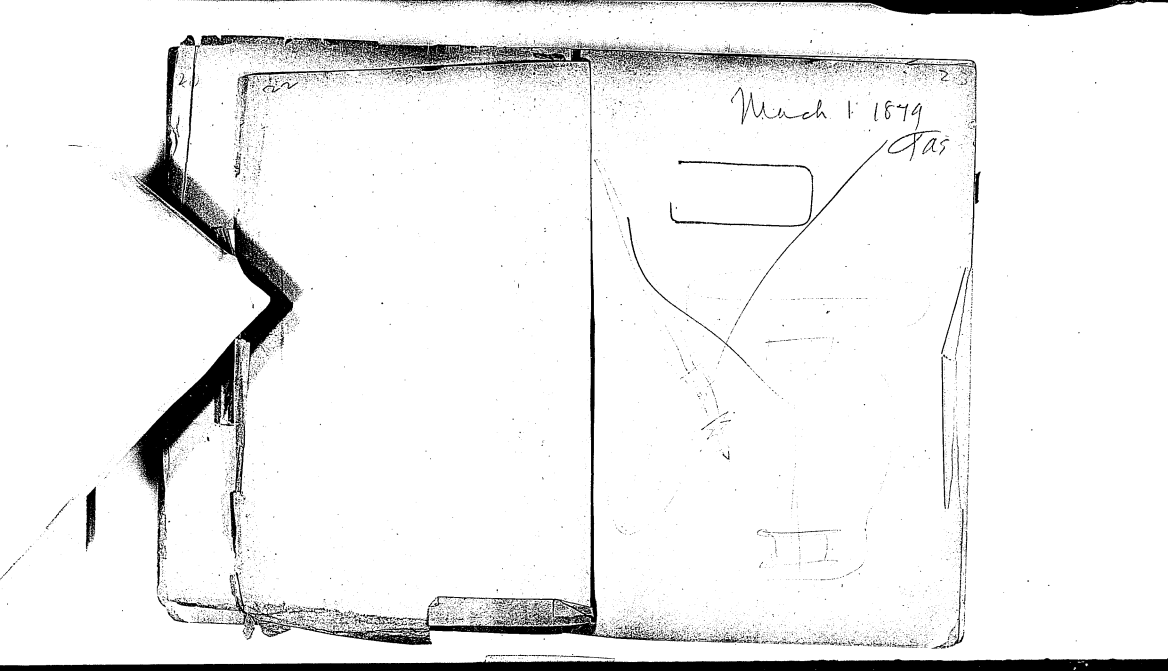
March 1 1879

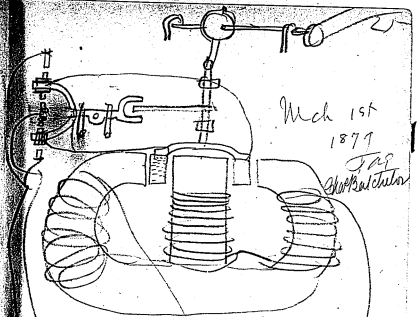
The
Shrapnel shell



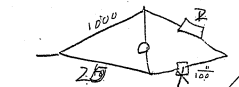


1 mm
Shell

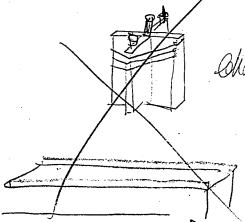

March 1 1849
Jas

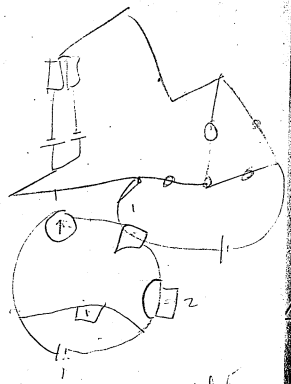

Mch 1st
1879
also with Commutator on
Revolving Shaft

.01
.02
.02
.05
.10
.2
.2
.5
1.
2.
2,
5
10
20
20
50



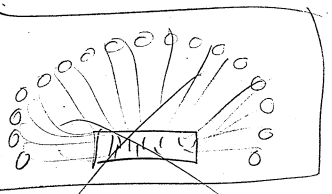
March 1
1879
Jas
Chas Bostwick





4 + B. 1. 1. d. 5.

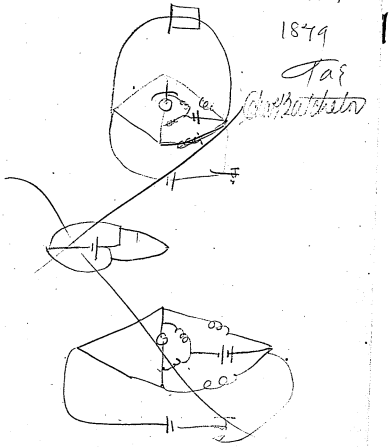
Y/5 N/3 3/11 Y/5



Mech 1st
1877 Tat
Chas Bolthelon

March 1
1879

Gas
Carburetor



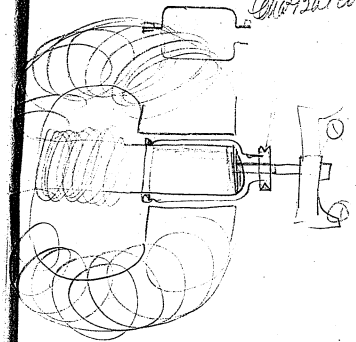
32

33

Coil of
Square Electric
Machine

March 5/79

T.A.E.
Chas. Batchelder



35
35
4 times 7 stays each
if white wire
March 5th 1879
AF

Wire No 16

Resistance 1·37 ohms

Resistance for 1000 feet 2·45 ohms

∴ 2·45 : 1000 :: 1·37 :

137	
245) 137 000	559
1225	
1450	
1225	
2250	
2205	

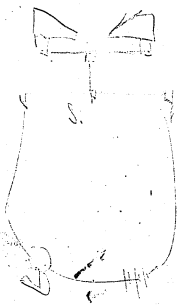
559 feet in all together

138 turns
13

Gram Ency 147

March 5th 1879

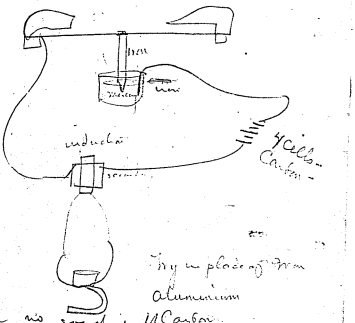
Jas



Telephone Experiments

May 20th 1879 -

Chas Batchelor



Try in place of Iron

Aluminium

All no good with Carbon

the exception of

carbon which was

very low + indistinct

Sulphide of Boron

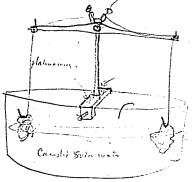
Sulphide of

Chromium

Platinum

Experiment no 2 67

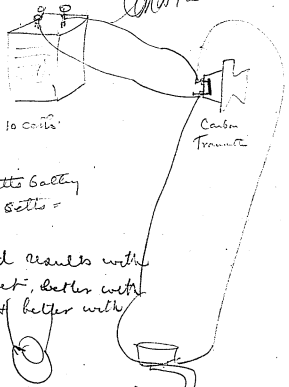
Malograph Engine (15) Cap. Chloroform



Dr. Ralph Batchelor
May 20th 1879

Experiment No 3 - 43

Short Batteries

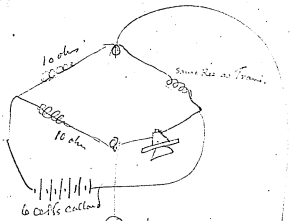


Exp. 2. Same Battery
also 3 Cells =

good results with
one Cell, better with
two & better with
Three

Talked through 126.4oz Ohms Resistance
heard it but very feeble ly. BSC

Experiment No. 4. VJ



6 cells each Limit Ohms Total =

worked pretty good.

Clear patches

Chalks March 28th 1912 47

Short Batchelor

1 }
2 } mounted pretty dry good
3 } talcking not very
4 }
5 }
6 } loud

1 2 3 4 5/8 soaked in water
for 2 minutes
6 soaked 5½ mins

stood 26 mins
all talcked loud but 6
not quite as loud as others

stood 6 hours
5pm. all talcked equal now
very good

All put on for 3 minutes more
except 6 and left it in 5
minutes

1 2 3 4 5 have been wet now
5 minutes
and 6 10½ min altogether
Stood 20 minutes
they do not seem to dry
quick especially 6 which seems
to have a great deal of Cassatte Soda on surface

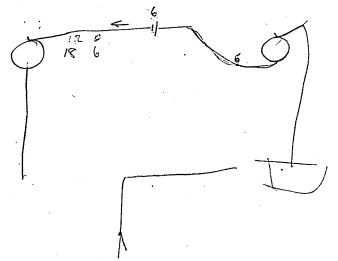
after standing 20 min I tried them and
found they all talked a little low but
6 was the best so

I let them stand 15 min longer

they now come up loud all alike

I now put 2 4 & 5 in crock and

and put 1 3 & 6 in water for 5 minutes
making 1 & 3 — 10 minutes
6 — 15½ minutes
Let stand 1:30 minutes & Edison tries them at 7 pm May 28.
They now stand as follows
1 wet 10 minutes
2 — 5 ——
3 — 10 ——
4 — 15½ ——
No 2 is loudest
No 4 is next
No 3 is next
No 1 is lowest & seems wettest
Left out at 7 pm May 28-
Tried them at 10 pm (the same)
Left them out


6
12
R
6
6

56

Oregon Oregon

Portland Oregon

Oregon

Berlin Oregon

Washington Territory

Portland

Ohio

Berwinville Ohio

57

June 18. 1879 T A E

Charpatchets

Record of well ground Checks etc for Chemical Telephone

Unknown — Nil-

Regular - Hg acetate added daily + well worked after ammonia NaO, added + organic well worked after

This check received not in use until Wetted - 7 shunted galvanometer Galvanometer with a Brad ley coil. With no shunt it was low but - putting in shunt of 35 ohm made it quite loud + shunt of 5 ohm the maximum loudness. 1st class but not extra loud. 2 ohm = Patched together

Not adjustable

R. 3200 @ 2500 one mouth
6000 @ 3700 other side.

Pt-3 to Cu
Cu 300 to Zinc
Rubbing small def to Zinc

54

402

30 grams sulphide Hg. (Merck)
NaO, Chalk. wet. grind, clean
pretty loud with only 5 ohms in
shunt quite low with 20 ohms
& hardly hear it without shunting
polarizing battery, & heat to wet
it- dry get nothing. Lacking
clear cut. Colored in shunt
Color white to flesh color.

R. 45000 grms Hg 2000
Pr- 10 to 2mm Ent Rubbing Dry Mixing
Con 150 "

59

403 Mushy Black oxide Hg. NaO, Chalk.
had to wet = good but not very loud without
shunt slightly more with shunt
35 ohms. any less God = & wet at
the mush and it cuts Pieces of chagle
stick to spring & steel & covers it
so can scarcely hear it was
quite loud on 35 ohm shunt
Dont polish- Cut groove 1/64
deep & too much in color.

R. 90000. due to 1000, Patte slowly when polarize.
Pr. 20@30 Tenuate 2mi
Con 150. "

Rubbing- Medium Deflection

6c

A.04

6

R-grass grants 27/00. Ben palmyi
Rs 3 (round) 2 wi Rubbing very much depleted
Rm 20 "

Chalk

+ Concentric

ground not

Regular NAO. -

scattering

XX bad - Can scarcely

to straighten

at it Cells

Cohen in short

Palisaded Tissue.

1.0.6. Regular

ground

ground =

Corner fair - Waste

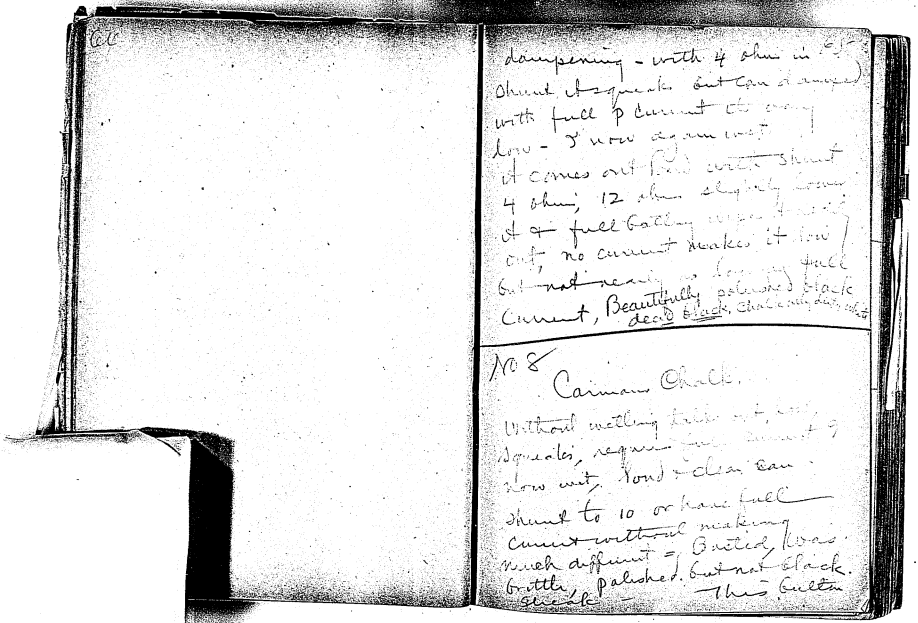
to palisade = Thick

after wetting, it [illegible] very loud - [illegible]

A.M. 1. Check, [illegible] No. 0. ground [illegible] Ro [illegible] [illegible] go until [illegible] - answers very Loud - clear - hear [illegible] without [illegible] 4 ohms - very [illegible] full battery - [illegible] [illegible] slight battery - probably [illegible] was more Hq [illegible] a Summit - [illegible]

[illegible] PM again [illegible] it works but not so loud, have to use about 4 ohms, [illegible] Summit [illegible] fearfully [illegible]

MAIL



dampening - with 4 ohm in
shunt squeals but can be damped
with full p current etc very
low - I now again use
it comes out best with shunt
4 ohm; 12 ohm slightly worse
& full battery with 4 ohm
out, no current makes it too
but not near so full
current, Beautifully polished black
dead black, clear only dull

No 8
Cairnaan Black.

Without melting battery out with
squeals, requires
low unit, loud & clear can
shunt to 10 or have full
current without making
much different = Battery lasts
better polished but not black.
Thus Gelton

Citronella conversation with a dutch angel with tight boots

871.

842

29 lbs def

8469600209 64

86 8 135

8960009609 7610

8.17

was made of 7½ grains metallic Mercury 3 oz Chalk, ½ of NaO.-

No 9

Hard Sodium Amalgam, made, Chalk + Rec NaO - ground well.- Watched it without watching = after watching had to shunt + got it laid. Shunt 10 ohms but it was fair on full current after which as NO gradually went on Chalk putting on shunt on full Current made no difference: after watching again, for first instant shunt lost in 1 minute made no difference With full Current in shunt = Loud clear - returned Ge

polished black but for the coal &
marks, the show that it would
take a large further amount
of NO, as it returned to hardness
after wetting twice.

No 10, (Bradley mixed)

2 oz Chalk
3/4 oz Comitat Ra.
9 grs Calomel.

Talked low without wetting;
after wetting loud in 10 secs
Amount, after few seconds scarcely
any difference between full Current
& Shunt, but in 1½ minutes
full Current made it much lower
than Shunt. - 9 wet again
without Current No 9. - 9 wet again
It gets a little louder but same
phenomenon occurs - this is very
loud & clear. — little pulled
no flocks

Extra Experiment

Reg Bannin. Having Lost the Hg - had another Lot Hg mixed & rammed in had to wet - after wetting - not loud, full & shunt fast to wire.

R: 1000 - no decrease polarizes immediately
Pt 28 towards Copp
Cu 200 @ 25°0 - Rolling small deflection on
a port of the deflection opposite direction.

No 11, Mercurous Nitrate, + Reg Chalk + NaCl -
Must wet - after wetting it came very loud, & it made no practical diffrence whether Current on or not. — Phenomena

on wetting 2nd time very loud, & it wets shunt is down once got hardly anything which only just Current Loud & it wore. Once Current Loud & it wore. fr polished block Sat. tool blanks prevents — another Phenomena:- & wet it

again ~~it~~ it comes loud, 73
& is about same with shunt
of 10 ohms on or off – but in 2
minutes its same as 1st
phenomena, shunt is low &
full Current is loud.

No 12.

Chalk NaO – precip block ox
Hg just after precipitation =
Squeaks at regular pressure
with full current – Talking with at
wetting low = Snow wet =
This has a spot in it that works
loud & the rest low. The loudness
is not very great, Must use
full Current, ~~No~~
Hardly hear it on shunt of
10 ohms, soft = no polish – groove sunk

13 —

Sulphate Hg - Chalk + NaCl
dry low

Phenomena — melting Hg
very low no difference in shunt
or full Current - Can barely hear
anything at all, More melting
Nothing but exceedingly low
Cuts = dont polish = sunk in.

14 Mercurous oxide - Chalk + NaCl
wet it, opens louder but not
XX loud. its little louder with
10 ohm shunt on - but squeaks
nearly as loud with full
Current without a squeak -
Keeps same for 2 minutes -
Dried again, same = daft.
sunk in dont polish

R. 9700 @ 1/100
short full + 1/10 on 1st 2 cells

Terms Very low - Low. pretty
Loud X loud XX loud & XXX
loud -

R 3500 Ω 2200

Ph – 5
Cu 200 — Normal Zinc
Rubbing along deflector

15 =

Block OX, Hg Mush. Chalk
NaO =
Hg until wet, then X load
with shunt & ohms. 1/2 or 1 load
full Current, but with shunt
squeaks slightly, then hold after
10 minutes – Polished but pitting –

16 – 50 grains Acetate Lead,
in NO, NaO + Hg Chalk enough
ground – after wetting, low
but shunt on or off absolutely
no difference in Loudness –
but squeaks slightly with
shunt on but only 2 ohms very poor
after 2 minutes squeaks
bad with shunt or full
current but makes no difference
– Looking – polish but
Chalk mixture –

17 Chloride Ammonium
Bichloride Mercury
Chuck – well ground

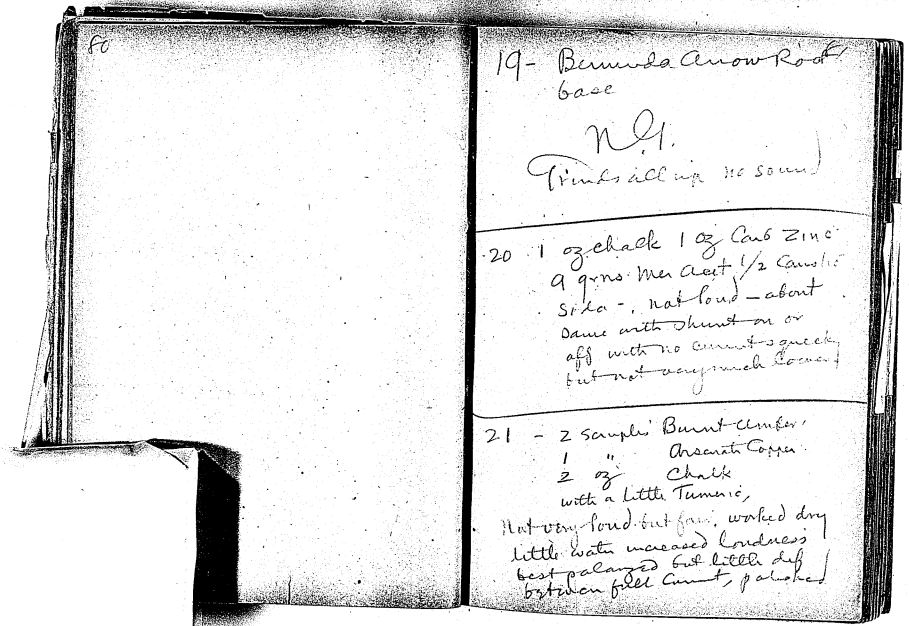
Pretty fair – low – best with
3 ohm shunt twice as low with
full Current, wet it twice
didn't do any better 2nd wetting
Faith) quite low before wetting
getting louder after 2 minutes.
no magn. in galvanom. 2 ohm shunt dif

Phenomenon – Sprucks with
Feeble Current, Strong Current

Wetting 3 times produced no change
during 1 hr. Sprucks with Strong
Current in 30 seconds & faintly

18 6 oz Zinc Carbonate
9 grains Acetate dilg
½ oz Caustic Soda.

Low – on either shunt or full
squeeky –


19- Bermuda Arrow Root
base
N.1.
Trinds all up No sound
20 1 oz chalk 1 oz Carb Zinc
9 grns Mer Acet 1/2 Cans Sulp
Silica -, not loud - about
same with Chlorate or
Alf with no current squeaky
but not very much Current
21 - 2 samples Burnt Umber,
1 " Arsenite Copper
2 oz Chalk
with a little Turmeric,
Not very loud but fair, worked dry
little water increased loudness
best balanced but little dull
by brown filled Current, pulsated

82

8600000 8.1

560 56 15 20

96- 5 5 0 0.

56 86009609 90.

England

81 98

England 960

56 5609609

Percentage. Mirror 94.7 - 82 pc...

Elect. Dynamics - 86 - 7½ p.c.

EMF 135 Volts

22. 18 grns acetate (end)
Chalk + NaO,

Mg. Low, works some [illegible]
off - friction bad [illegible]

23- 6 oz Barytа
16 - pennyweight 12 grs. Sodium [illegible]
1/2 oz NaO.
Had to wait it - then it was
Daft - Low, - cut chalk -
groove 1/32 deep. - no diff.
on shunt or full current.

R. 35-00 @ 12.30
Pt - 140 16 a. Bad
Rolling mean Inside Coil

24 → Reg Barytа
Mg at all. wait it
slightly too.

Rowland.

84

25 6 oz Barita

8 dwt - 6 grs. Soda Amalgaman

1/2 Caustic Soda

No 1. Heavy slow - no difference

shunt on off - squeaks No

Emg action

Res. 11000. spot to 3900
Normal, 10000 to 3000
Pt 6 to 2 min 3 sec with spot
Cu 60 " " 2 " " "
Rubbing - Insert detector

26. 1 oz 13 dwt. Amalgam

6 oz Barita 1/2 oz NaO

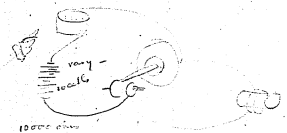
No 1.

R. 8000. goes to 1500. Item constant Pb - 6 to 2n
Rubbing during deflection Cu 150.

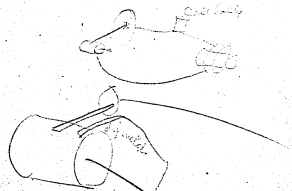
No 9. Put on again & dident work at all. Took out & cleaned everything Considerably found it changed somewhat was lower on shunt than full Current to-night also a little lower —

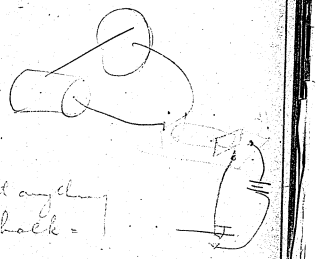
85

Experiments -



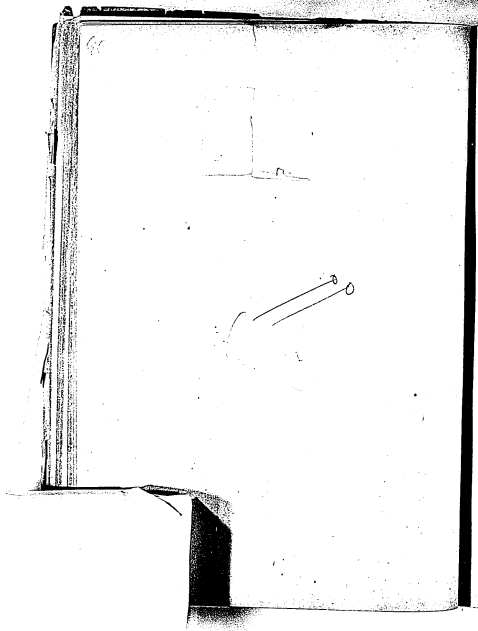
Try cell battery here





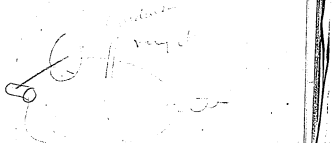
Use of gas any change in dry Chuck -

Measure the Resistance in the Chucks after testing -

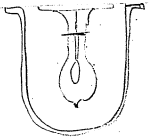


test the current with a shock
given different speeds.

Try high tension coil for use
in laboratory.



Upton has two platinum
wires in Carbolic Acid
Cincinnati — Use also in
H_2O_2, diluted with water, acidulated
with H2-sulphuric acid in water.



My EMG [illegible] Sedimentary and Igneous Rocks Dated + Signed — day —

with 4 checks with 1/2 of [illegible]
HCl - [illegible] with
NaOH 20 drops No [illegible]
required no [illegible]
immediate [illegible]
of adding [illegible]
checks [illegible]
in 4 minutes [illegible]
a dark [illegible]
[illegible] emulsion
ink as they come from
mixed very well but
stays. Leave as warm
slightly more [illegible] emulsion 2
Check the same as above
with the exception that 9
grms acet Hg added to melt
same [illegible] perhaps a
shade louder but requires

full battery to polarize or rather it Requires a Current but it may be weak or strong it makes hardly any diff— 2 Cells not a good —

Put on a Bunsen with HO made Alkaline with NaO, 20 drops Cannot get a sound with or without battery = Harsh - don't polish grinds the ~~Chalk~~ Battery

Put on a Chalk HO, with 20 drops & make mod strong solution Soda & put Chalk, the moment we add the soda it requires battery - to polarize when it soaks in & wants full battery

but 10 ohm will work -
The last few checks are
sensitive to replacing
outer rotor ring & end.
but found Enough to
Writing with NCl, pretty
strong makes it London than
weak 20 drops already in.
There is no streak in these
Cuttings - it was undoubtedly
the excess of Caustic that
produced that -

I try another Bangla. NOC & NO,
20 drops & rest of with weak
NOO.NO, Nothing written
written but Cutting,

Fundamental Experiments.

(No 3) - Chalk and water = as much as one man can put on pressure with 2 levers = Without wedding - polishes beautifully - pretty fair. can read with ear 3 inches away - clear don't squeak - any current weakens it - Put acid on paper - water lowers it greatly / added Sulphuric, had polarog. for ff 6 of Uptons list.

Resistance 5500 ohms

Pt. 5 towards Zn end

Cu 60 " "

Rubbing sharp towards Zinc end

Same difficulties in all parts of circle. polished very much did.

But after wetting + adjusting Transmitter little it wasn't very loud.

No 2. Two of them. As much pressure as 2 men can put on with 2 levers; 1st one was without anything loud enough to hear 1 inch away increased pressure lowered it- requires no polarization current, afterwards got so loud could hear it ~~with~~ to read perfectly with ear on diaphragm — 2nd one as, louder with pressure, no scattering could hear ~~to~~ read 2 inches away it buzzed -

uptons test

R. 8000.0
Pt - 5 to Zinc end
Cu 70 " same deflection in all parts. rubbing shining to Zn end. the deflection in all cases diminishes as the point remains a long time on the chalk.

Chalk + H_2O - 105-

(No 1) - 3 hours & 2 men as much pressure as they can put on — Chalk had initial inclination - hour reading 4 inches away then gave up to broadness of chalk tendency to squeak - with less pressure not so loud - no squeak - polish after -

Original Chalk =

Hard, without weathering. Tendency to aquiclude. London ord. more thick than the other, get Emeq-jumps with polaq battery. Fault battery too strong 5 ohms in ohmmt maximum hardness, = can't read much away. q-d on with 6 ut tool mark in it.

Upton, Test.

Res 7501 ohms. seems to polarize quicker in measuring. Pt. 2 to 2mc sup. Qr 40 to 2m. no difference in deflection rubbing gave moderate deflection

Original Barrier, with ~~Exhn~~
Hg added for that driven off by
heat. Hard, rather rough, great
tendency to squeak, have to burn
& polish before talking comes so
can hear, only just heard 1/2 inch
from diaphragm too much escape
noise, squeaky even with less
pressure requires 5 ohm shunt
& current.

Upton test

Res 1 side 40 000. other side 80 000.

Pt ~~to~~ 2 to 2m End
Cu .20 to 30 — Rubbing smooth
effect same all over

Chalk. with 1 man pressing on 1 lever. = Brushed.

4 oz @ Chalk. + H_2O. 2 grains sulphate Soda, hard - Natural sky comes out so can work 2 inches away no wetting, any current works also no Emy Jump, White glassy polish

Uptons Test

decrease
R 4000 @ 2300 — dec R by C.

Pt - 3 towards Zinc

Cu 300'.

Rubbing - Strong def to Zn end

No 6. 4 oz chalk. $4H_2O$. 2 grms Cheap [illegible]
Substrate Potash - hard - no binding
to squeak - not scrapy. Can scrape
it mechi away sometimes. Mutcher
pretty clean. Was Emy slight jump
towers talking with my Comment,
Very smooth one, what you may
polish.

Uptons Tests.

R 4000. to 1600 due by C.
Quite rapid change and polarization
P+ 5 towards Zinc
Cu 300.
Rubbing - Strong Diffraction

(7

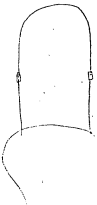
4 oz Chack H_2O, 2 grains
Chloride Ammonium, heavy precipitate
Hard. No sparkle, not loud
appears that saturation not
good, any current leaves
Cu jump very easily to get
it all or nearly all have to put
ear in deeply to get it
(and even with this) 4
inches away still don't get it
very plain. Coal makes no
impression

Upton test

4500 ohms

Pt. 6 to 2 mic cm)
Cu 70 "
no change in various parts nothing
strong change

116



75

115

Prof. of H2O.
Chalk 1 main pressure

Very smooth with hard pressure no scrape - talking Clear & makes away, any current to evens, Emy jump slight, polish - very slight cut, but had on too much steam,

Uptons test.

Res 6500
pt 5-@ 4 to zinc end
Cu 250 "
Rubbing strong, difficult in groove not so strong as outside.

4 oz Chack, $4H_2O$. 2 gms. Nitrate ammonia. Heavy precipitate, hard, not very scrappy. No spreak. Read 4 inches away any current bowing it, pretty good one, Emg Jump (10 divisions) smack, glassy polarity. To all marks, upturn test,

Res 1600 @ 1200 ohm
Res decreases after current has passed a few moments.

Pt 2 to zinc
Cu 75- " less in groove
Rubbing gave very strong deflection to Zinc end,

No. 4. 121

4 oz Chalk + $\frac{1}{2}$0. 2 grms
Substitute Soda. Light pressure
Softer - not very scratchy
Scratch - Read 2 inches away
any Current known it.
Emery jerk not shining.
polish glassy - Cuts very slightly

Upton Test -

dec.
Res 1300 @ 1100
Resis decreases with Current
polz afterward =
Pt - 5. toward Zinc
Cu 300 "
Rubbing medium deflection.

105°; Chalk 4½20. 2 grms. Cl⁻ Na,
Light pressure no squeak
very mod scrap. Read 2 inches
away. Emery rung not strong.
any current [illegible] it.
polish glassy

Upton Test.

2000 @ 1100 dec
R fell as current passed, very slowly

Pt 5- towards Zinc.
Cu 250 @ 300 "
Rubbing. medium diffusion.

1905. Heavy pressure, Chalk 1/4" H_2O, Na Cl. 2 grms, Hand, not scraping. Emg action small amp current - lowers it, read at 4 inches away, polarised strong

Upton Test

R. 3000 @ 1600 - dec by current

Pt - 5 towards Zinc.
Cu 300. "

Rubbing = strong def towards Zinc

No 7. Light pressure.

4 oz Chalk. 4 H2O. 2 grms. Chl ammonium
no scraping - not a weak hissing comes.
read about 7 inches away
Emy action small, any ammt
greatly weakens sound. polish
glossy.

Uptons Test

Broke the Putter =

Chalk. ② oxfilm.

With pressure of 1 man pressing on lever 3/4 out.

Soft. Emy action smooth, any current weakens it. Read with ear on diaphragm but not well. little scraping, not much, no squeak. Cuts a little: polish glassy

2nd Chalk Sent same, Upton Cook

Res 5000 @ 350°

Resistance decreases after the current has passed some moments.

Pt 5- to 2mc end

Cu 300@350 "

Rubbing strings very slight deflection.

4 oz chalk H_2O. 2 grains Chloride Calcium — Heavy precipitate. No Scraping at all, no squeaking. Read 10 inches away. Emy action small, any Current weakens it. polish g Cassy — Total marks slightly.

Upton Test

2000, @1700.

Resistance decreases after the Current has passed through for a few moments, then seemingly increases + polarization occurs.

Pt 15 @ 20 towards zinc end
Cu 240 @ 300 " "
Rubbing Strong deflection.

132

9

133

Light pressure, Chalk H_2O, 2 grms
Chl Calcium: about same as heavy
pressure but not so loud Read
4 inches away Emy acts
not strong, any current
weakens, glassy polish - local
marks slightly -

Uptons Test

R fall from 4000 ohms at first
Tap to 1500, before pulsing

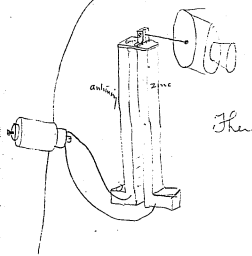
Pt - 5 towards Zinc
Cu 300 "
Rubbing - strong deflection -

Reg No 7 Turned to off - Fe after Eng jumps. Tacking not loud could not read more than 4 inches away — scrapy — squeaks little, requires five manipulations of 1 to 5 ohm — ohmit to obtain maximum — hard to work it twice = The tacking on magnets is low — there may be a ring in this or coils,

Go to page 155

Feb 28th 1919

Glass tube

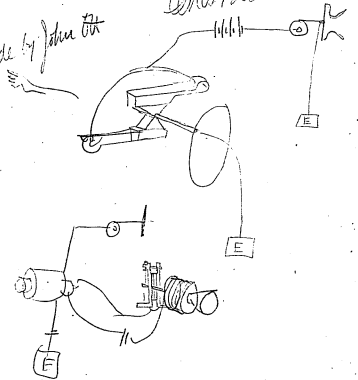


Thermo Junction

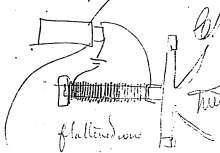
Telegraph telephone Feb 20th 1879 13

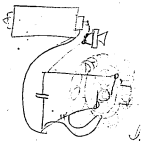
Chas Batchelor

made by John Ott

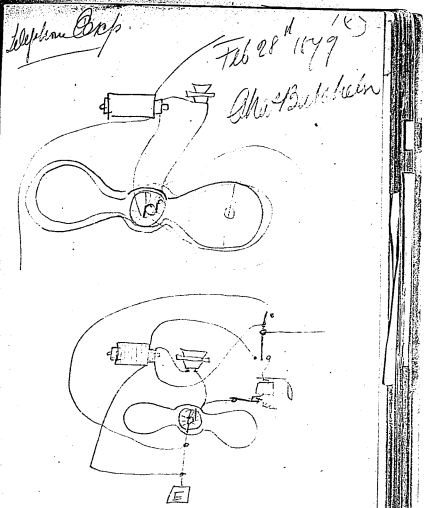


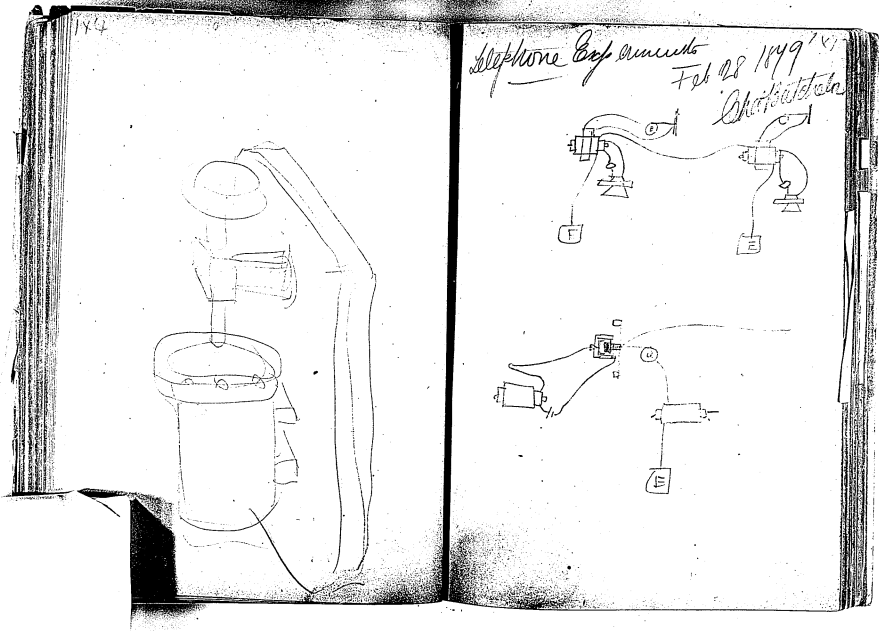
Telephone Exp. Feb 28 1879 [illegible]





Condenser in [illegible] battery




Telephone Apparatus
Feb 28 1879
Charlestown
D
C
F
E
C
D
E

Carbon button Feb 28th 1879. 1x5

Disk 1/2 a dollar

Carbon button warming

Carbon Lamp Black mixed with plumbago =

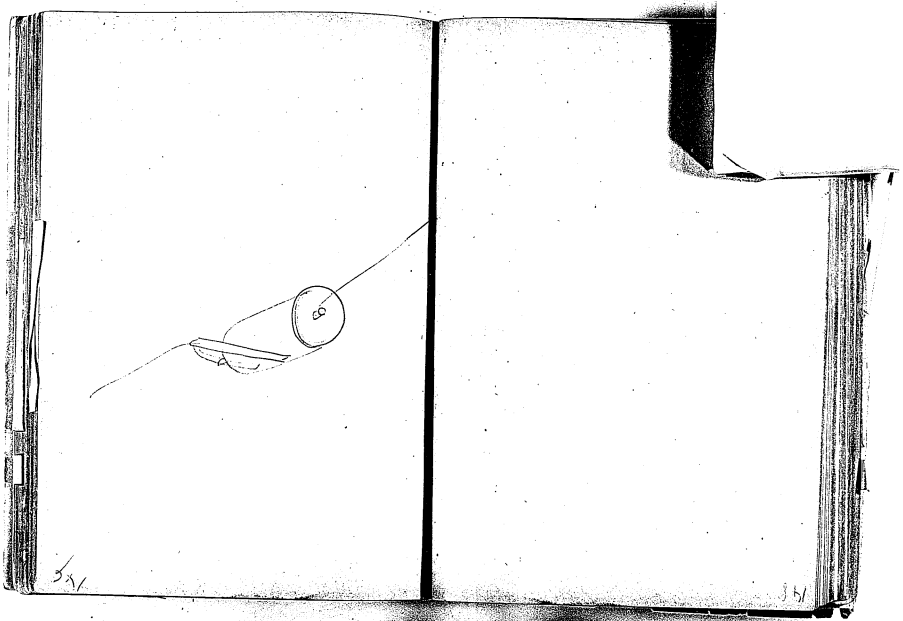
Powdered coke & lamp black cooked with Lamp black =

Retort Carbon button cooked with Lamp Black =

Lamp Black & Plumbago

Lamp Black & dextrine

" " Clay



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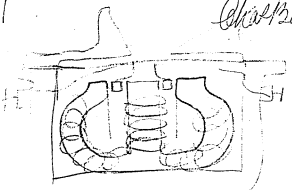
Telephone. March 1 1879 - 154

Chas Batchelor



Worked well but not so loud as a Bell telephone
Articulation perfect
Batchelor

March 2 1879

U.S.
Charbatcheler

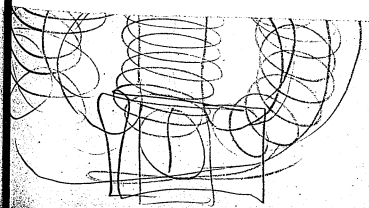
Induction Coils for Telephone

Edison Laboratory Note Book No. 20.

Page 128.

See Edison Patent:

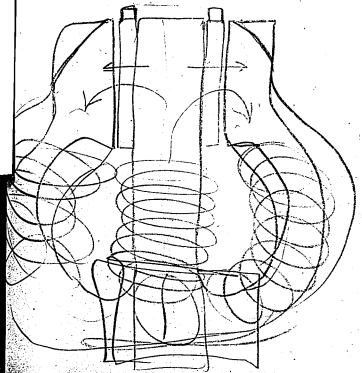
270,128

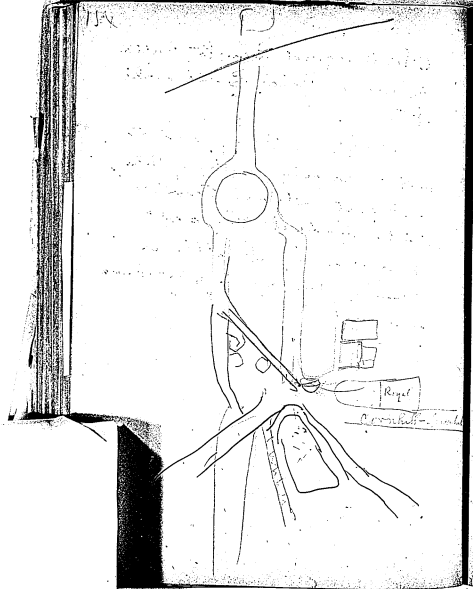


March 2 1879

Tate
Chorbat Ferila

Induction Coils for Telephone

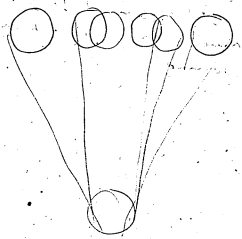




Old Original Bangla Gulta
as near as Golch Could make
it.—

N.B. nothing had to
wet = scarcely anything then,
wet with Shiny Camelia
Seeds made it too soft
after drying it little in
flame & try again. Don't hear
a sound.

16



I never go over all melting them –

No 3 – Chalk H_2O. As much as a man can put on 2 levers,

Portland

3

June, 20 1899

Test for new lot of 180 chalks.

No 1- 4 chalks 3 oz chalk.
9 grams acet Hg- ½ oz
Conc Chl Calcium. EMF action
very strong- Phenomena cannot hear
a single sound, yet Magneto on mouth
is loud ~~+~~ Emf action on chalk loud
After wetting with H2O, dont hear a
mortal Sound yet Emf very strong.
polished.

2nd chalk not a sound Emf action
strong = wet at no sound

Francis left ~~Short~~ ckt Gueton in
July

See next page

160

161

weak. squeaky. Strong Emg action = works with or without P. current. very poor can scarcely hear = All cut up - chopped off no polish.

2nd check. Read 6 inches away best with fuel. P. current, clear not squeaky. not very well polished Cut in one place, Tried weak $NaOH_2O_2$ on it. not so good =

3rd Not quite so good as 2nd Rower Cut a little

Pipe clay – Sulphur – Wet acet.
Chk Calcium. – Nly. soft scarcely
marks enamel, This is
the celebrated Button prepard
by Prof McLaughlan the
platinum champ assisted by
"Basic"

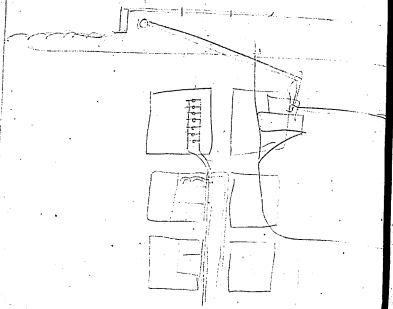
Tripoli – wet walking –
wet with weak $NaOH_2O_2$
very low –

---

4 oz Chalk –
10 grns $CaCO_3$ not found
have to put ear½ inch from
chopping to hear little
diff between Cumnt + no
Cumnt but Emy not quite
strong; little scrapy – polished
but not glossy over

No XX.
Same as other did not wet,
Battery lowered it, talking
good 4 inches away no
scraping - polish nice,
I lay this aside to test
at intervals

Batches Button = Waxy
no grating = low but with
can on sharp no grating a
clear - gets louder, appear
too wet, wants full battery
at first afterwards its not
necessary for full battery.
The second Button with double washer
Mfg. wet strip at too soft =

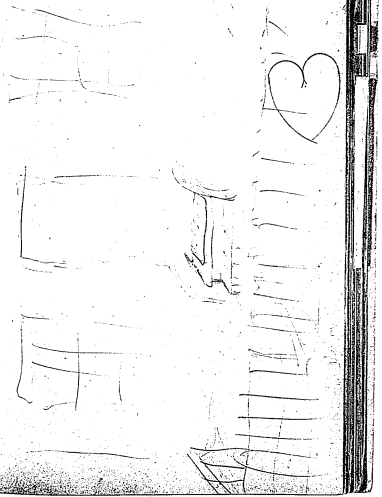


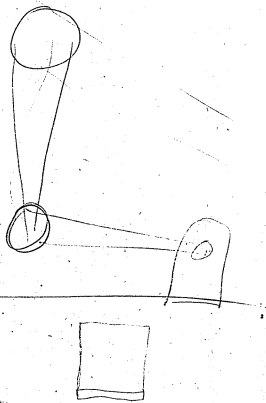
50,

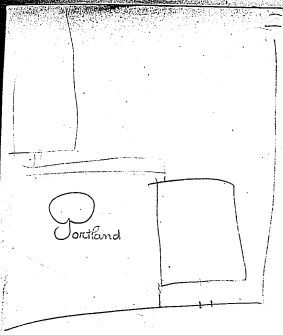
2 oz Chalk - 3 drops FeCl.
10. CaCl. cured read much
away after welling was
lower but very very
gradually got powder
scraping considerable,
polish glassy. Battery
weakened. it,

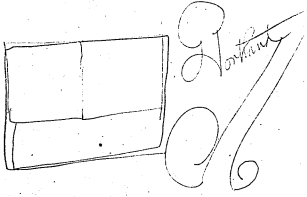
---

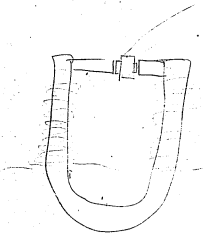
2 oz Chalk.
1/4 - oz H_2O. & 15 drops
$C_2H_4O_2$ = (3 5) Read it with
away = slight scraping - balling
weaken. - I now wet it, it
soon comes up to nearly same
loudness = polished.



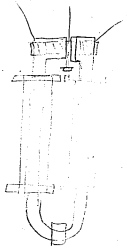



Portland

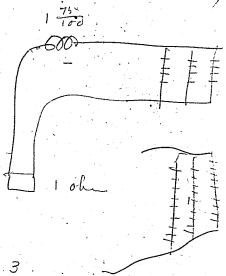

Portland

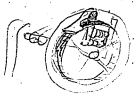


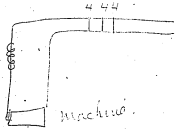
3,



Transvaal Republic


1 ohm




Minchin

178

Maccles 2nd Button (52) -

Can't hear it.

Uptons test

90,000 to 19000 ohms polarizes, it was very long in falling.
(15-cell battery used)

Added Water. Could scarcely hear a sound

Uptons test,

7000 ohms to 8500 — falls to 3000 @ 4500 —
pt + Cu End
Cu 300 to Zn end
Rubbing the least effect of any yet.
Through two or 2 places the groove medium deflection

(53) Chloride Calcium only not a sound of any kind it got moist on outside.

Uptons test,

Very moist.

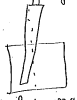
Pt. 100 towards Cu
Cu – off scale to Cu end

5000 – @ 35-00 – then galvanizes,

2 oz Chalk
1/4 oz Caustic Soda.

Loud - old time Ponderosa.

All the change that I can see is that I have shortened sideways



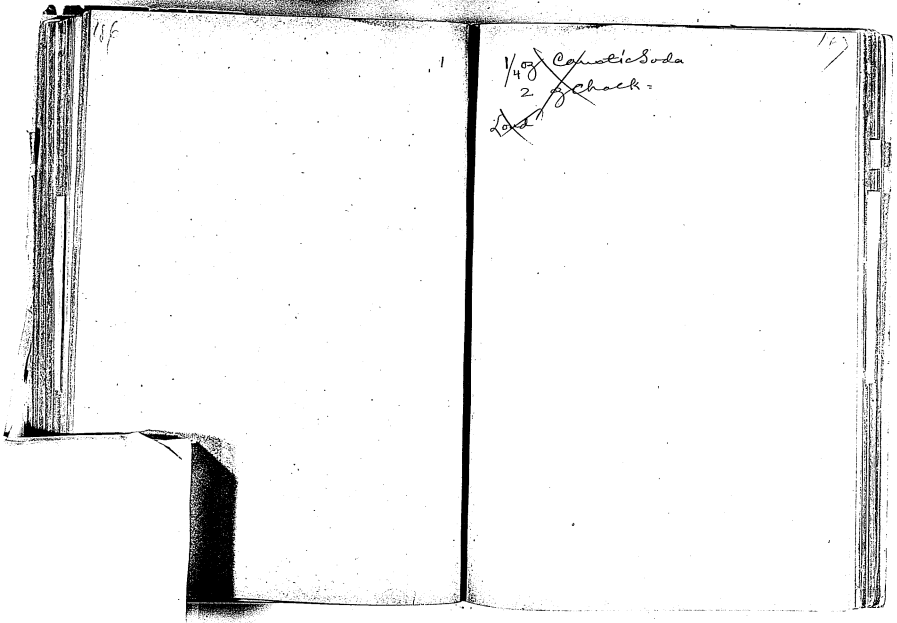
Requires weak current to polarize; no margin negative almost dead current too much. Low — no current Low — and it cuts a groove wider than Pure Platinum =

∴ Upton's Test.

R 1150. falls very quickly to 950. then polarizes very slowly. seems to be very sensitive the short strokes of the key throws enough current through the button to change it.

resolution
Pt — 5 to Zinc
Cu of scale to Zinc
Rubbing on small deflection Black spots on the button when Pt goes in rubbing a shiny deflection

1 oz chalk
1 oz dry Chloride Calcium
natural sound



First one that is any way sound without polarizing battery 2 oz Chalk. 1/4 oz Sal Conc Ca Cl. pretty smooth. & wet it = came so could read 2 feet away - required no battery to polarize. Battery lowered it. Even weakest Current. & put in a new spring other one cut in slightly & became unsoaked with new spring & can use greater pressure. & now wet again with Conc Chl Ca - find that it lowers & requires slight battery but & after wet with H_2O. & it came back to old readings & wet with H_2O again polarized highly.

.2 oz Phosphate Lime
1/4 fl.oz - Caustic Soda

Hardest bullen saw - very low with smooth dilute NaO. Came so could read 3 inch away - not very scrapy not agreeably full current least - Look in awful bat of H_2O before & wet with weak H_2O NaO, - after immersion got dryer a comminuted squeak - & notice that when & put ~~Caustic Soda~~ on a smooth chalk it makes it squeak polished

1½ oz Chalk - 1/2 oz dry
Chl Ca —
Mg.

Chloride Lithia ¼ oz saturated,
2 oz Chalk -
Needs no batting loudest
without batting - wound answer
if all cured be made equal
to it = scraping small,
clear talking, polish nice,
after wetting takes long
time to get loud again

So far I have tested several chalks, having chalk 2 oz NaO. 1/4. these chalk have worked but only so so yet better than anything else. They were mos alike finding that those chalks were not pressed hard I had some pressed hard The first one tried gave talk as loud as I ever heard you could get it with full bathing if you turned somelime or you could get it without bathing. But not so loud the greatest strength was with about of about 2 obtained it worked way I had with light pressure over

Know try another hard '57 pressed chalk =
find it the same

I know try a chalk still harder pressed this requires no water, - and if you deal with no polarization it works Loud & OK =

~~Now~~ I try another & it act precisely the same, we now ~~repo~~ powder chalk 2. up + removed, -

Uptons Test -

first - 2 :
Res 1300 @ 1400 : no change
ohm, very constant
very small changes
Pt - 15 - Toward Zinc
Cu 15.0 "
Rubbing - Throw - off scale : -

over

198

199

Uptons test of

Hand of pressed one, which was not wet.

R 45-00 ohms. goes to 1200 ohms.

slow fall + then polarization.

Pt – 5 Zinc end

Cu 100 "

Pebbling moderate deflections

Finish

Chalk 2 oz Caustic Soda ¼ oz —
1st Chase, pressed very hard 4
men pressure — previously moulded
then sifted & removed, put in
telephone no water put slight pressure
on & turned many times, then increased
pressure & turned many time, increasing
pressure until perfect polished ring
formed — No palonizing Cement
lacking — bowl & Chalk, with great
or small pressure, another Chalk
just like this spoilt by just
willing by heading sponge on &
turning three times around,
Chalk must not be wet after
moulding — this willing dont
loose Tackiness, rather increases
it. But it acts so much just as if
Turpentine was too far away
when if unwet chalk put in
lacking clear — the pressure on

These chalks must at least be 200000 lbs/in. Don't think they will lose moisture owing to fineness & hardness, they get harder the more you work them. Ring nicely galvanised = U

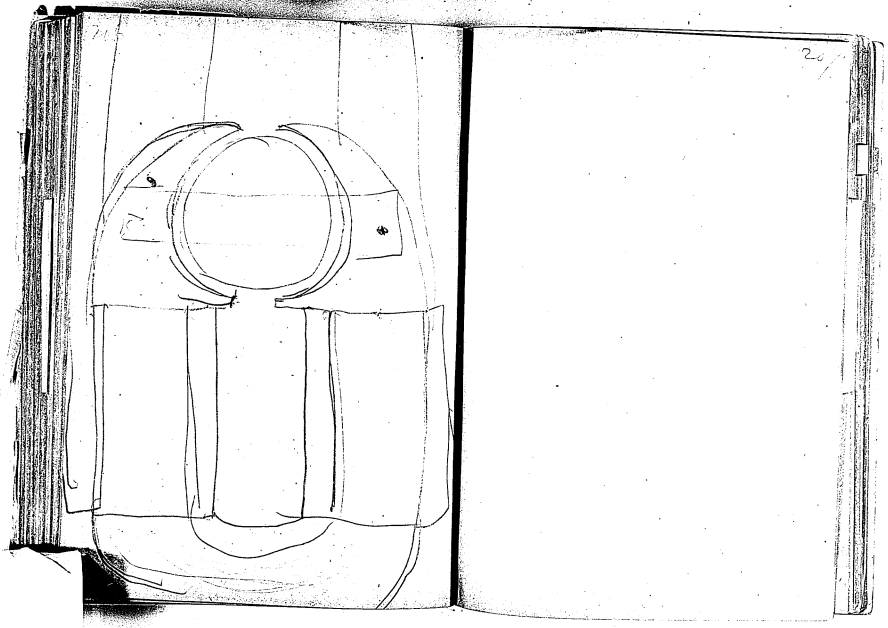
Upton Test

Resistance 9500 ohm reduced by Current (15 cells) through 1000 to 3500. then nearly constant don't seem to polarize.

Pt 5 to 7 in Cu
Cu 5-0 to Zinc End

Rubbing gave small deflection towards Zinc End.

This Current makes a spot by drawing water to the spring & makes it wet.

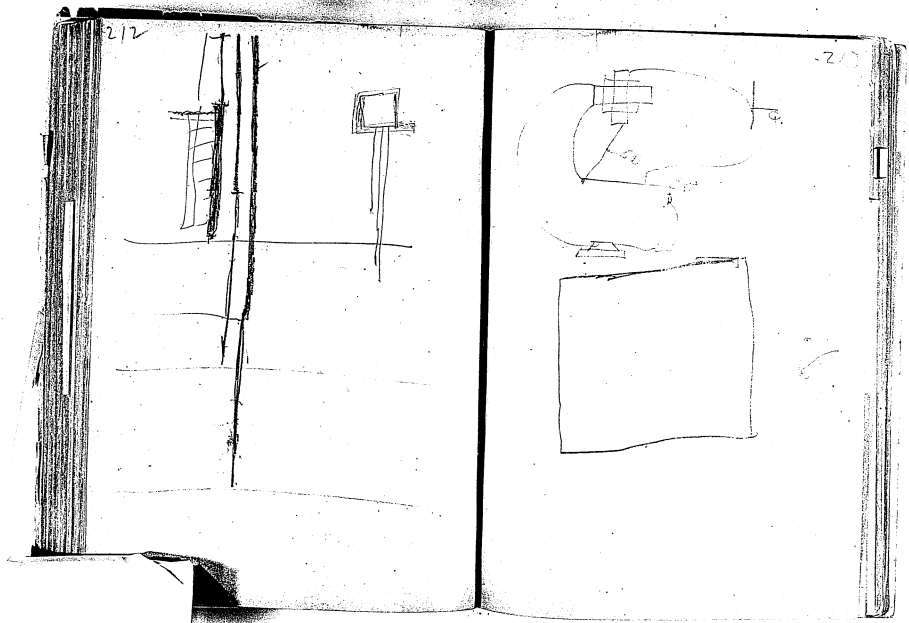


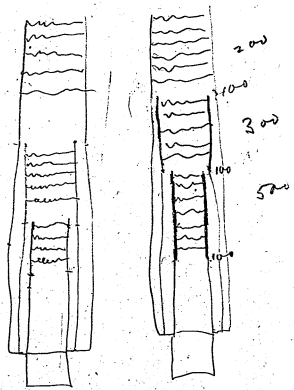
1.12705	2	
1.1 3 1 3 7	.05194	
	9.94633	
	0/1.99827	99.6
99.6 X 1.26572	1.99827	
1.27017	.10216	
	9.99613 -10	
	1.99656	99.2
99.2 X 1.4417	1.99656	
1.44739	.15889	
	9.83911 -10	
	1.99456	98.7
98.7 X 1.67822	1.99456	
1.68667	22955	
	9.77348 -10	
	1.99289	98.3
98.3 X 2.009	1.99289	
2.01669	.30298	
	9.69588 -10	
	1.99122	98.
98. 2.5843	1.99122	
2.5 1 2 9 1	.39870	
	1.89965	
	1.98957	97.8
97.8 X 3.3444	.52436	
3.3561	9.47610 -10	
	[illegible]	

211

100.333	2.00145	5.00084
20.0883	1.30175	.0169
	0.69970	5.02853
50.253	1.70119	3.3447
15.0253	1.17683	.0115
	0.52436 ✓	3.35562
33.562	1.52585	2.5129
13.3562	1.12569	.00961
	.40016 ✓	2.5225
25.2251	1.40184	2.0145
12.5225 1	1.09768	.0976
	.30416 ✓	2.02219
20.2219	1.30582	1.6827
12.02219	1.07998	.00584
	.22584 ✓	1.5885
16.68854	1.22754	1.4605
11.68854	1.06777	.0054
	.15977 ✓	1.4550
14.55089	1.16165	1.2671
11.45509	1.05885	.00
	1.10280 ✓	1.2726
12.17205	1.10451	1.1285
11.27205	1.05300	00
	1.05251 ✓	1.1329
11.32296		

1.12885	3.05251		211
1.13230	1.05423		
Σ .99656	.99828	99.6	2
R .99312	1.10280		
	9.89549 -10		
Σ .99314	1.99657	99.2	3
R .98628	.15977		
	9.83835-10		
Σ .98938	1.99469	98.8	
R .97876	.22584		
	9.77246-10		
Σ .98598	1.99299	98.4	
R .97196	.30416		
	9.69418-10		
	1.99133	98.	
	.43316		
	9.58816-10	97.6	
	1.97765		
	.52432		
	9.47415-10		
32	1.98816	97.3	
	.64770		
	9.34586-10		
94 .97334	1.98667	97.	Cinco
88.5 .94668	2.	96.	Cuarenta
	7.93467 -10	94.	Ochenta
96.674	.98337	93.2	Cinco
93348		92.	Cuarenta
		90.	Ochenta





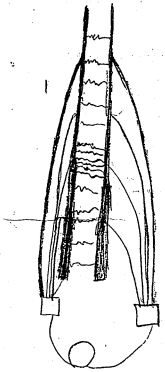
Edison Laboratory Note Book No. 20.

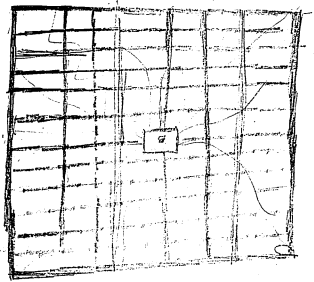
Pages 214 to 218.

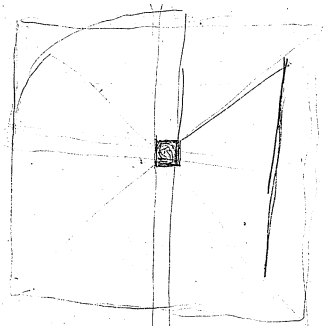
Systems of Electric Distribution.

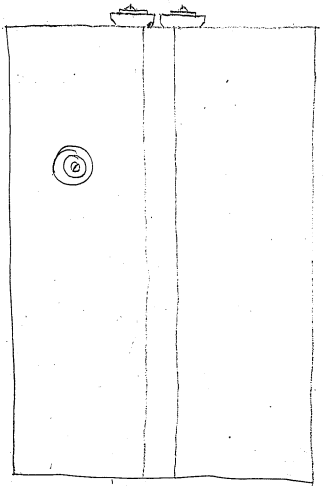
See Edison Patents:
239,147
264,642

2/X
2/J
10'
10'









78 / 9 / 7.03 bushels in an. yard

Suppose $10 expended in conductors for each lamp used at the busiest hour of the day

10

100

.365 ct per day for interest

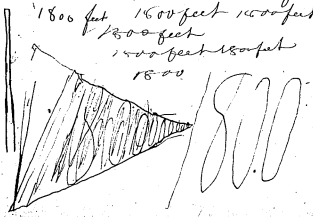
a Station put in centre of a square ½ mile on side longest line

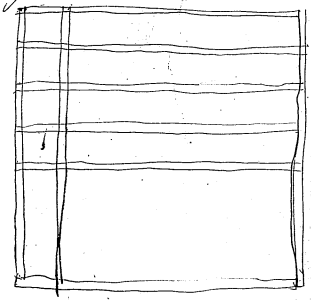
5 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4

36000 feet

1800 feet 100 for wire

1800 feet 1800 feet 1800 feet 1800 feet 1600 feet 1600 feet 1800 feet 1800 feet 1800





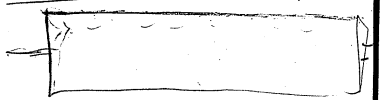
6 inches

363

363

363

363



226

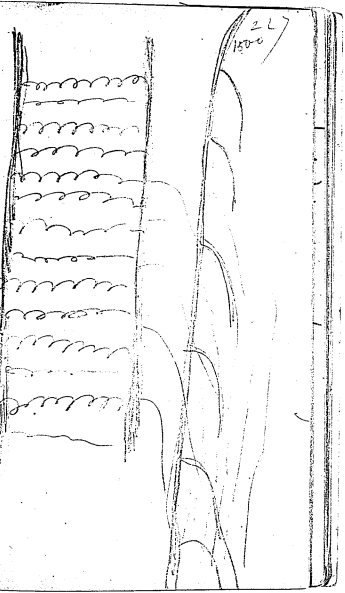
1/4 in. wire

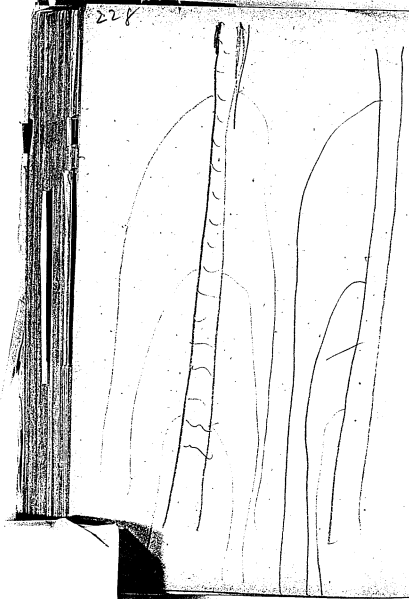
1000 feet costs

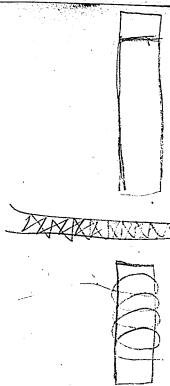
250 20 cts. per

$50.

.2







9 sets of fans x machines and conductors be taken whatever is true of that must be true for the whole system

150 Volts required

150 Volts ½ ohm in machine

30 lights 5 H.P

1 3 ohms in lamp

1/3 ohm in conductor

3.33

3.333 = R

150 Volts

150 2.1761

150 2.1761

Cu 8.83 9.4168

44.3 1.[illegible]

5.1134

26000 4.8866

.5169

7.88 HP

3 .4771

383 .5833

.9590

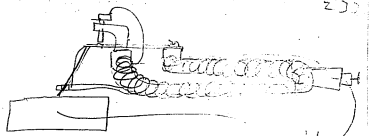
78% [illegible] lamp

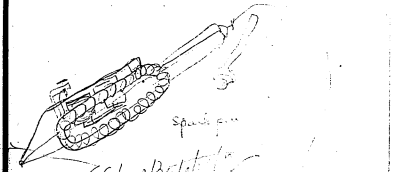
30 lamps in multiple

40 lamps per machine
300 at utmost limit
30 for regular use at
busy hours

Machine $125
Magnetizing machine 25
$150

30 @ $5 per lamp for
machine. Conductor $5





274

$5 a camp interest per day

.50 / 365 = log 1/365 = 7.4377 -10

1/365 = .00274

$5 .80 — .00274 × 5 = .1370 cts. per day

$6 — .00274 × 6 = .1644 cts.

$7 — .00274 × 7 = .1918 cts.

$8 — .00274 × 8 = .2192 cts.

$9 — .00274 × 9 = .2466 cts.

$10 — .00274 cts.

$11 — .274 × 11 = 274 + 274 = .3014

$12 — 274 × 12 = 548 + 274 = .3288

$13 — 274 × 13 = 822 + 274 = .3562

$14 — 274 × 14 = 1096 + 274 = .3836

$15 — .274 × 15 = 1370 + 274 = .4110

$16

274
16
1664
274
.4404

$17

274
17
1918
274
.4658

$18

274
18
2192
274
.4932

274
2
.548 cts per day

$25

(27400
.685 cts

$30

274
3
.822

If thirty dollars were invested to pay for a lamp conducting machine, ~~at the track was~~ this being for the ~~year~~ use at the full hours, it would be .72 cent per day for interest a 10 ~~per~~ cent

for E.L .375 would be received per hour

at 6 per H.P. profit cost 2 cts an hour

.333 cts for cost.

Gas 5 feet

$1.00 a Thousand

1/2 ct an hour

E. L. must be sold at rate of 75 cts. a thousand to introduce it as against gas even at present prices.

Reasons. people must have light and would be very slow of changing if there was any danger of the light being ~~in~~ ~~ingnited~~, or disturbance of chandeliers or walls.

$\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$

6 per H.P
2 cts per hour

8)3.00
.375

375
.333
.042

At ten per H.P. .2

These lamps may be put in the same conductor. If by any means the lamps are only put out part of the time. The difficulty in this would be to regulate them each. If the "jigger" should stick for a moment the lamp would burn away. On the principle of regulating the E.M.f. so that the lamps may never burn away. This cannot be done at all. The only way then is to turn the lamp intensity on

Ten per H.P. are needed to make the E.L. a ground success. The following experiments are need to be performed.

Testing regulator or jigger

Testing E.M.F. of ~~from magnet~~ and power obtainable with magnets.

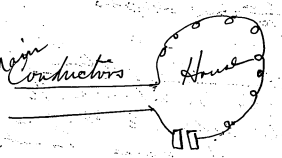
Testing motor

In testing metre fluid
next 2nd Whether the plates
change in weight by immersion
in the fluid. 2nd shows
small amount of current
may be measured on ash tube
I like to see how
exactly a small amount of cur-
rent may be weighed this experi-
ment seem very easy

10 Lamps per H.P.
10 Lamps per H.P.

Question is a contrary
E.M.F. the same for
subdividing as a resistance
on which the same amount
of energy shall be given
off and the laws of the
same.

I think not.
Yet, in a machine
as in a lamp the E.M.F.
falls gradually
But the law of
the distribution of
energy is different.



Nine 10 Ohm lamps and
1 Ohm motor

100 Volts E. M. F.
Each lamp 3300 ft. lbs
or 1/10 H.P. 4430
The same current must
be the same

100 Volts

$\frac{100}{\frac{100 \times 10}{19}} 44.3 = 44300$

1 lamp and motor

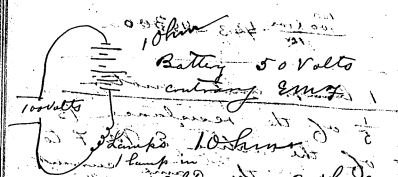
$\frac{1}{5}$ of the resistance $\frac{1}{5}$ of the active E. M. F to produce the same current over resistance

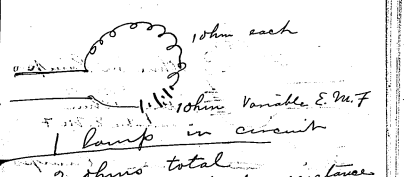
4/5 current = 80 Volts
Fall due to resistance 20 Volts
" " motor E.M.F 80 "

Distribution of energy

2 or 1 in lamp and resistance
8 or 4 " motor

1 in Lamp
9 " motor





2 ohms total

1/5 of resistance against when all the lamps are in and nothing but the resistance of battery without E.M.F.

Therefore 1/5 of the active E.M.F. will give the same current

20 Volts active E.M.F
80 Volts contrary " " "

Distribution of work

2 in resistance
8 in work in battery
1 in resistance of lamp
9 in resistance and E.M.F of battery

When ~~all~~ three lamps and battery are in circuit E.M.F. for 100 volts. ~~one lamp goes off~~

44 30 ft lbs

E.M.F. 3

4 lamps in

$\frac{1}{2}$ the resistance

$\frac{1}{2}$ the ~~—~~ E.M.F.

50 Volts active

50 Volts contrary

~~550000~~ ft lbs on 4 lamps

$$\frac{50 \times 50}{5} \times 44$$

$$500 \times 44$$

$$22000$$

$$4400$$

$$17,600$$

On four lamps

48 4 candle gas jet.

$\frac{1}{2}$ inch .020 2½ Ohms

~~6~~ 40

6.2
6.2
124
372

.020
.020
000
126
.126

6.3) .020 (.33
189
210

.003.3

20
20
400

3.3
3.3
99
99
10.89

9.9
4.9

6 Sprague about
75 lbs
4 150 lbs there and back
12 $ 37.5 Edisons House
$ 4.10 hr Camp about
$ 1.00 Camp to Office &c
500
$ 250 average

1/8 3/8

1/16 X 3/8 = 9/128 = 3/43

= 1/14

2/32 1/16

1/16 in surface on Jablochkoff.

1/16 1/32 15

1/92

Thread

Oct. 22, 1879.

~~200~~ Electromotive force requisite to run an 100 ohm lamp when N lamps are obtained by three power

$$\frac{E^2}{R}\,44.3 = \frac{33{,}000}{n}$$

$R = 100$

$$E^2 = \frac{100 \times 33{,}000}{n \times 44.3}$$

33 000,000 | 6 5185
44.3 | 1.6464
2 | 4.8721
2.4360

$n = 1$ 2.72 Volts

$n = 2$ 4.8721 · 3010 = 2 | 4.5711 = 2.2855

193

$n = 3$ 4.8721 · .4771 = 4.3950 = 2.1975

157

$n = 4$ 4.8721 · .6021 = 4.2700 = 2.1350

136

$n = 5$ 4.8721 · 6990 = 4.1731 = 2.0865

122

$n = 6$ 4.8721 · 7782 = 4.1099 = 2.0469

111

$n = 7$ 4.8721 · 8451 = 4.1170 = 2.0585

104

$n = 8$ 4.8721 · 9021 = 3.9690 = 1.9845

96

$n = 9$ 4.8721 · 9542 = 3.9179 = 1.9589

91

15 4.87721
1.17761
2 | 3.69960
1.84480 70.

16 4.87721
1.20241
68 | 3.98680
1.83420

17 4.87721
1.23014
3.64117
1.82068 66

18 4.87721
1.25553
3.61686
1.80844 64.

20 4.87721
1.30116
3.57711
1.78855 61.

n = 2.5

4.87721
1.39779
3.47742
1.73711 54

30 4.87721
1.47771
3.39950
1.69975 50

40 4.87721
1.60021
2 | 3.27700
1.63350 43

50 4.87721
1.69990
3.17731
1.58865

60 4.87721
1.77782
3.09939
1.54969

Estimate of Cost

~~Estimate~~

3 15 HP
Horse power $90
Boilers $18
Land &c $15
$123

Dynamo machine $150
6 per H.P. when all are on
10 hrs of power delivered by
machine
3 sets 15 Candles
~~$5 x 8 per c~~
$50 p H.P
Lamps & Shades
5-6 per H.P

$223 per H.P invested
6 | $22.30 per year per H.P.
$3.82 " " per lamp
1 ct per day per lamp
5 feet of gas
1000/5 = 200 $1.00/200 = ½ ct.
2 hours a day average
1 ct per hour

If the
want confirmed on
Hay,

1

1 Providence 10th

But will

es. but will have to order

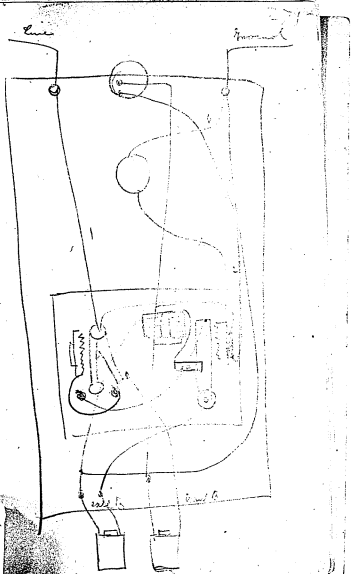
wire specially and can't

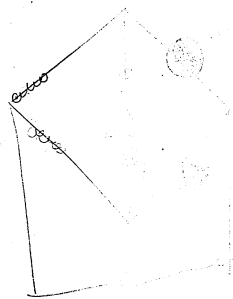
send before middle of

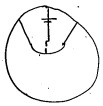
next week answer if wofshall

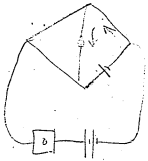
and if so

found ?

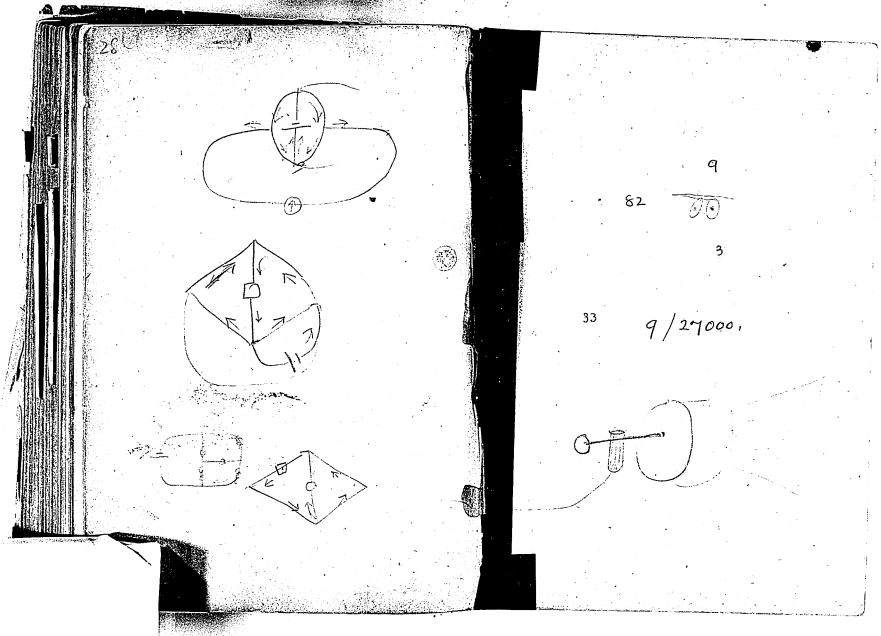








772
77209


26
9
82
3
33
9/27000.

Thomson
Caveat